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UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XX February 15, 1936 Number 3

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A host list for Heterodera schachtii, compiled by Margaret N. Corder, Edna M. Buhrer, and Gerald Thorne, is given on page 38. The compilers stress the fact that in this country attack by this nematode is of economic importance on only a few of the more common hosts.

The occurrence of hop diseases on the Pacific Coast in 1934 and 1935 is reported by G. R. Hoerner, page 48.

Plant diseases in Tennessee, as observed during 1933, 1934, and 1935, are discussed by Paul R. Miller with special attention to weather relations and amount of loss, page 53.

A brief statement by Paul R. Miller, page 58, adds data for pears, pineapples, grapes, squash, and cherry to the information on plant disease losses in market and kitchen. (Plant Disease Reporter Supplement 88, 1935)

The occurrence of Venturia on azalea, and of Botrytis on Exacum affine, are reported by Thelma B. Post, page 61.

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A LIST OF PLANTS ATTACKED BY THE SUGAR BEET NEMATODE

(HETERODERA SCHACHTII)

Compiled by

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Introductory Note

The Use of Host Lists for Plant-Parasitic Nematodes

Hosts of the sugar-beet nematode, Heterodera schachtii Schmidt 1871, are listed herein. When consulting this list the reader will easily be misled unless the following points are considered: This list constitutes only a guide to the hosts that have been encountered for the different populations of H. schachtii under various ecological conditions. Actually only a few of the more common hosts, such as sugar beets, cabbage, turnips and other members of the genus Brassica, will ordinarily be found infested in the fields of the United States.

Host records may have been based on a single infested plant; e.g. several white females of the sugar-beet nematode were found on the roots of one of numerous plants of Portulaca oleracea in a field at Brigham City, Utah, in 1922. This field was visited several times during later years without finding another infested plant. Charles Price, of the Division of Sugar Plant Investigations, discovered one plant of Amaranthus retroflexus infested at Salinas, California, in 1921. At the same time and during the following years, hundreds of plants were examined in this, and other localities, but none was found infested.

Due to what apparently are biological variations of the sugar-beet nematode, a plant may be found acting as a host over only a small area; e.g. in two adjacent fields near Lehi, Utah, both heavily populated with Heterodera schachtii, Chenopodium rubrum was generally infested in one but not at all in the other. Oats are severely infested in fields near Toronto, Ontario, but not in the United States, an excellent illustration of a regional host.

Another vital point is whether or not the few nematodes found on rarely infested plants are actually reproducing. Determination of reproduction has not been made in any such instance known to the writers and yet this is the final information necessary in determining a true host.

Geographical and biological host variations are well illustrated by the fact that fields of sugar beets in the western United States, heavily infested with sugar-beet nematode, are successfully rotated with alfalfa, oats, wheat, barley, potatoes, tomatoes, celery, beans, peas, clover, and corn for the purpose of nematode control. In the hundreds of fields growing these crops not one case of transfer has been observed, although in this list all are given as hosts.

It is possible that individual nematodes will appear which possess slight variations in feeding ability that enable them to successfully attack new hosts. These variations will probably be just as apt to attack plants not in this list as to confine themselves to already known hosts. Considering the limited number of hosts known in the United States, few divergences from the original population have occurred among the myriads of H. schachtii living in the hundreds of infested fields. Nevertheless vigilance must be continued, not only because of the development of new populations but also from the standpoint of introduction from other countries.

Each host plant is listed alphabetically under its accepted scientific name (numbered, and in capital letters), under its synonym if such is found in nematological or plant pathological literature (in small letters and parentheses), and under its common names, if such are in general use (in small letters without parentheses).

Hosts known to be affected by Heterodera schachtii in continental United States of America are marked *; those observed by members of the Division of Nematology are marked +. The marks occur before the accepted scientific name only.

Mr. F. V. Coville and Mrs. Agnes Chase, of the Division of Plant Exploration and Introduction, kindly aided by thoroughly checking the nomenclatorial standing of the plant names, and supplied the latest recognized generic, specific, and common names.

Host Plants of Heterodera Schachtii Schmidt, 1871

1. AGROPYRON REPENS (Triticum repens), Quackgrass
2. AGROSTEMMA GITHAGO, Corncockle
3. AGROSTIS CANINA, Velvet bent.
   (Aira caespitosa) = DESCHAMPSIA CAESPITOSA
   Alfalfa, MEDICAGO SATIVA
   Alfileria, ERODIUM CICUTARIUM
   Allseed, CHENOPODIUM POLYSPERMUM
4. ALOPECURUS PRATENSIS, Meadow foxtail
5. ALSINE MEDIA (Stellaria media), Chickweed
   Amaranth, redroot, AMARANTHUS RETROFLEXUS
* 6. AMARANTHUS RETROFLEXUS, Redroot amaranth
7. AMMOPHILA ARENARIA (Ammophila arundinacea; Psamma arenaria), European beachgrass, Sea maram grass

(Ammophila arundinacea) = AMMOPHILA ARENARIA
8. ANAGALLIS ARVENSIS, Red pimpernel
(Anchusa arvensis) = LYCOPSIS ARVENSIS
9. ANCHUSA OFFICINALIS, Common bugloss
(Apium graveolens) = CELERI GRAVEOLENS
10. ARACHIS HYPOGAEA, Peanut
11. ARRHENATHERUM ELATIUS (Avena elatior), Tall oatgrass
Artichoke, Jerusalem-, HELIANTHUS TUBEROSUS
+ * 12. ATRIPLEX CONFERTIFOLIA, Shadscale
13. ATRIPLEX HORTENSIS, Garden orach
+ * 14. ATRIPLEX ROSEA, Redscale
+ * 15. ATRIPLEX SP.
(Avena elatior) = ARRHENATHERUM ELATIUS
16. AVENA FATUA, Wild oat
(Avena flavescens) = TRISETUM FLAVESCENS
17. AVENA SATIVA, Oat
Barley, HORDEUM VULGARE
Barley, two-rowed, HORDEUM DISTICHUM
Base-rocket, RESEDA LUTEA
Beachgrass, European, AMMOPHILA ARENARIA
Bean, adsuki, PHASEOLUS ANGULARIS
Bean, Broadbean, VICIA FABA
Bean, bush, PHASEOLUS VULGARIS HUMILIS
Bean, Horsebean, VICIA FABA EQUINA
Bean, kidney, PHASEOLUS VULGARIS
Bean, lima, PHASEOLUS LUNATUS MACROCARPUS
Bean, Soybean, SOJA MAX
Beet, common, BETA VULGARIS
Beet, sugar, BETA VULGARIS
(Beta altissima) = BETA VULGARIS
+ * 18. BETA VULGARIS (Beta altissima), Common beet, Sugar beet, Mangold
Bluegrass, annual, POA ANNUA
+ * 19. BRASSICA ALBA (Sinapis alba), White mustard
20. BRASSICA ARVENSIS (Sinapis arvensis), Charlock
(Brassica campestris), published erroneously by Kühn (1881) for "kohlrübe", rutabaga
21. BRASSICA CAULORAPA (Brassica napus rapifera; Brassica oleracea gongylodes), Kohlrabi
+ * 22. BRASSICA JUNCEA, India mustard
+ * 23. BRASSICA NAPOBRASSICA, Rutabaga
(Brassica napus oleifera) = BRASSICA NAPUS var.
(Brassica napus rapifera) = BRASSICA CAULORAPA
24. BRASSICA NAPUS var. (Brassica napus oleifera), Oilseed rape
+ * 25. BRASSICA NIGRA (Sinapis nigra), Black mustard
26. BRASSICA OLERACEA ACEPHALA (Brassica oleracea viridis), Kale, Collard
+ * 27. BRASSICA OLERACEA BOTRYTIS (Brassica oleracea botrytis cauliflora), Cauliflower, White broccoli

(Brassica oleracea botrytis asparagoides) = BRASSICA OLERACEA ITALICA
(Brassica oleracea botrytis cauliflora) = BRASSICA OLERACEA BOTRYTIS
(Brassica oleracea bullata) = BRASSICA OLERACEA CAPITATA
(Brassica oleracea bullata gemmifera) = BRASSICA OLERACEA GEMMIFERA

+ * 28. BRASSICA OLERACEA CAPITATA (Brassica oleracea bullata; Brassica oleracea sabauda), Cabbage, Savoy cabbage

29. BRASSICA OLERACEA GEMMIFERA (Brassica oleracea bullata gemmifera), Brussels sprouts

(Brassica oleracea gongylodes) = BRASSICA CAULORAPA

30. BRASSICA OLERACEA ITALICA (Brassica oleracea botrytis asparagoides), Asparagus broccoli

(Brassica oleracea sabauda) = BRASSICA OLERACEA CAPITATA
(Brassica oleracea viridis) = BRASSICA OLERACEA ACEPHALA

31. BRASSICA PEKINENSIS, Peking cabbage

+ * 32. BRASSICA RAPA (Brassica rapa oleifera; Brassica rapa rapifera), Turnip

(Brassica rapa oleifera) = BRASSICA RAPA
(Brassica rapa rapifera) = BRASSICA RAPA
Bristlegrass, green, SETARIA VIRIDIS
Broadbean, VICIA FABA
Broccoli, asparagus, BRASSICA OLERACEA ITALICA
Broccoli, white, BRASSICA OLERACEA BOTRYTIS
Brome, smooth, BROMUS INERMIS

33. BROMUS INERMIS, Smooth brome
34. BROMUS MOLLIS, Soft chess
35. BROMUS SECALINUS, Chess

Brussels sprouts, BRASSICA OLERACEA GEMMIFERA
Bugloss, common, ANCHUSA OFFICINALIS

36. BURSA BURSA-PASTORIS (Capsella bursa-pastoris; Thlaspi bursa-pastoris), Shepherds-purse

Cabbage, BRASSICA OLERACEA CAPITATA
Cabbage, Peking, BRASSICA PEKINENSIS
Cabbage, Savoy, BRASSICA OLERACEA CAPITATA
Cactus, EPIPHYLLUM ACKERMANNI
Cactus, king, HELIOCEREUS SPECIOSUS

37. CAMELINA SATIVA, Bigseed false-flax

Canary grass, hidehead, PHALARIS PARADOXA
Canary grass, reed, PHALARIS ARUNDINACEA

38. CANNABIS SATIVA, Hemp

(Capsella bursa-pastoris) = BURSA BURSA-PASTORIS
Carnation, DIANTHUS CARYOPHYLLUS
Carrot, DAUCUS sp.
Cauliflower, BRASSICA OLERACEA BOTRYTIS

39. CELERI GRAVEOLENS (Apium graveolens), Celery

Celery, CELERI GRAVEOLENS
(Cereus speciosus) = HELIOCEREUS SPECIOSUS

(Chaetochloa viridis) = SETARIA VIRIDIS
Charlock, BRASSICA ARVENSIS
40. CHEIRINIA CHEIRANTHOIDES (Erysimum cheiranthoides), Treacle-mustard
+ * 41. CHENOPODIUM ALBUM, Lambsquarters
42. CHENOPODIUM GLAUCUM, Oakleaf goosefoot
43. CHENOPODIUM POLYSPERMUM, Allseed
+ * 44. CHENOPODIUM RUBRUM, Red goosefoot
Chess, BROMUS SECALINUS
Chess, soft, BROMUS MOLLIS
Chickpea, CICER ARIETINUM
Chickweed, ALSINE MEDIA
Chicory, CICHORIUM INTYBUS
45. CICER ARIETINUM, Chickpea
46. CICHORIUM INTYBUS, Chicory
Clover, crimson, TRIFOLIUM INCARNATUM
Clover, red, TRIFOLIUM PRATENSE
Clover, white, TRIFOLIUM REPENS
Collard, BRASSICA OLERACEA ACEPHALA
Corncockle, AGROSTEMMA GITHAGO
Corn, Indian, ZEA MAYS
Cowpea, VIGNA SINENSIS
Cress, garden, LEPIDIUM SATIVUM
Dandelion, LEONTODON TARAXACUM
47. DAUCUS sp., Carrot
Deadnettle, LAMIUM sp.
48. DESCHAMPSIA CAESPITOSA (Aira caespitosa), Tufted hairgrass
49. DIANTHUS CARYOPHYLLUS, Carnation
Dock, curly, RUMEX CRISPUS
Dock, RUMEX sp.
50. EPIPHYLLUM ACKERMANNI (Phyllocactus ackermannii), Cactus
51. ERODIUM CICUTARIUM (Geranium cicutarium), Alfileria
(Erysimum cheiranthoides) = CHEIRINIA CHEIRANTHOIDES
(Faba vulgaris) = VICIA FABA
False-flax, bigseed, CAMELINA SATIVA
Fescue, meadow, FESTUCA ELATIOR
Fescue, red, FESTUCA RUBRA
Fescue, sheep, FESTUCA OVINA
52. FESTUCA ELATIOR (Festuca pratensis), Meadow fescue
53. FESTUCA OVINA, Sheep fescue
(Festuca pratensis) = FESTUCA ELATIOR
54. FESTUCA RUBRA (Festuca rubra stolonifera), Red fescue
(Festuca rubra stolonifera) = FESTUCA RUBRA
Foxtail, meadow, ALOPECURUS PRATENSIS
(Geranium cicutarium) = ERODIUM CICUTARIUM
(Glycine max) = SOJA MAX
Goosefoot, oakleaf, CHENOPODIUM GLAUCUM
Goosefoot, red, CHENOPODIUM RUBRUM
Grape, VITIS sp.

Groundsel, SENECIO sp.
Groundsel, spring, SENECIO VERNALIS
Hairgrass, tufted, DESCHAMPSIA CAESPITOSA
55. HELIANTHUS ANNUUS, Common sunflower
56. HELIANTHUS TUBEROSUS, Jerusalem-artichoke
57. HELIOCEREUS SPECIOSUS (Cereus speciosus), King cactus
Hemp, CANNABIS SATIVA
Henbane, HYOSCYAMUS NIGER
Henbit, LAMIUM AMPLEXICAULE
(Holcus saccharatus) = SORGHUM VULGARE SACCHARATUM
Hop, HUMULUS LUPULUS
58. HORDEUM DISTICHUM, Two-rowed barley
(Hordeum sativum) = HORDEUM VULGARE
59. HORDEUM VULGARE (Hordeum sativum), Barley
Horsebean, VICIA FABA EQUINA
60. HUMULUS LUPULUS, Hop
61. HYOSCYAMUS NIGER, Henbane
62. ISATIS TINCTORIA, Woad
Kale, BRASSICA OLERACEA ACEPHALA
Knotweed, broadleaf, POLYGONUM MINIMUM
Kohlrabi, BRASSICA CAULORAPA
Ladysthumb, bigseed, POLYGONUM PENNSYLVANICUM
Ladysthumb, pale, POLYGONUM LAPATHIFOLIUM
Lambsquarters, CHENOPODIUM ALBUM
63. LAMIUM AMPLEXICAULE, Henbit
64. LAMIUM sp., Deadnettle
65. LATHYRUS CICERA, Flatpod pea
66. LATHYRUS ODORATUS, Sweet pea
67. LATHYRUS SATIVUS, Grass pea
68. LATHYRUS TINGITANUS, Tangier pea
(Lens esculenta) = LENTILLA LENS
69. LENTILLA LENS (Lens esculenta), Lentil
Lentil, LENTILLA LENS
70. LEONTODON TARAXACUM (Taraxacum officinale), Dandelion
71. LEPIDIUM SATIVUM, Garden cress
72. LEPIDIUM sp., Peppergrass
(Lolium italicum) = LOLIUM MULTIFLORUM
73. LOLIUM MULTIFLORUM (Lolium italicum), Italian ryegrass
74. LOLIUM PERENNE, Perennial ryegrass
(Lolium westerwoldicum) probably meant for LOLIUM MULTIFLORUM
Lupine, Cruckshanks, LUPINUS MUTABILIS CRUCKSHANKSI
Lupine, European yellow, LUPINUS LUTEUS
Lupine, white, LUPINUS ALBUS
75. LUPINUS ALBUS, White lupine
(Lupinus cruckshanksii) = LUPINUS MUTABILIS CRUCKSHANKSI
76. LUPINUS LUTEUS, European yellow lupine
77. LUPINUS MUTABILIS CRUCKSHANKSI (Lupinus cruckshanksii),
Cruckshanks lupine
78. LYCOPERSICON ESCULENTUM, Tomato

79. LYCOPSIS ARVENSIS (Anchusa arvensis)
Mangold, BETA VULGARIS
80. MATRICARIA sp., Mayweed
Mayweed, MATRICARIA sp.
81. MEDICAGO LUPULINA, Black medick, Yellow trefoil
(Medicago media), a hybrid between MEDICAGO SATIVA and M. FALCATA
82. MEDICAGO SATIVA, Alfalfa
Medick, black, MEDICAGO LUPULINA
Mignonette, RESEDA sp.
Mustard, black, BRASSICA NIGRA
Mustard, India, BRASSICA JUNCEA
Mustard, white, BRASSICA ALBA
Nasturtium, TROPAEOLUM MAJUS
Nettle, big, URTICA DIOICA
Nettle, dog, URTICA URENS
Nightshade, bitter, SOLANUM DULCAMARA
Nightshade, black, SOLANUM NIGRUM
Oat, AVENA SATIVA
Oat, wild, AVENA FATUA
Oatgrass, tall, ARRHENATHERUM ELATIUS
Orach, garden, ATRIPLEX HORTENSIS
83. PAPAVER RHOEAS, Corn poppy
84. PAPAVER sp., Poppy
Parsnip, PASTINACA SATIVA
85. PASTINACA SATIVA, Parsnip
Pea, field, PISUM SATIVUM ARVENSE
Pea, flatpod, LATHYRUS CICERA
Pea, garden, PISUM SATIVUM
Pea, grass, LATHYRUS SATIVUS
Peanut, ARACHIS HYPOGAEA
Pea, sugar, a horticultural form of PISUM SATIVUM
Pea, sweet, LATHYRUS ODORATUS
Pea, Tangier, LATHYRUS TINGITANUS
Pennycress, THLASPI ARVENSE
Peppergrass, LEPIDIUM sp.
(Persicaria lapathifolia) = POLYGONUM LAPATHIFOLIUM
(Persicaria punctata) = POLYGONUM PUNCTATUM
86. PHALARIS ARUNDINACEA, Reed canary grass
87. PHALARIS PARADOXA, Hidehead canary grass
88. PHASEOLUS ANGULARIS, Adsuki bean
89. PHASEOLUS COCCINEUS, Scarlet runner
* 90. PHASEOLUS LUNATUS MACROCARPUS, Lima bean
(Phaseolus mungo var. subtrilobata) (Probably meant for Adsuki bean, PHASEOLUS ANGULARIS)
(Phaseolus nanus) = PHASEOLUS VULGARIS
91. PHASEOLUS VULGARIS (Phaseolus nanus), Kidney bean
92. PHASEOLUS VULGARIS HUMILIS, Bush bean
93. PHLEUM PRATENSE, Timothy

(Phyllocactus ackermannii) = EPIPHYLLUM ACKERMANNI
Pimpernel, red, ANAGALLIS ARVENSIS
(Pisum arvense) = PISUM SATIVUM ARVENSE
(Pisum quadratum) = a horticultural form of PISUM SATIVUM
(Pisum saccharatum) = a horticultural form of PISUM SATIVUM

94. PISUM SATIVUM, Garden pea
95. PISUM SATIVUM ARVENSE (Pisum arvense), Field pea
96. PLANTAGO LANCEOLATA, Buckhorn plantain
97. PLANTAGO sp., Plantain
Plantain, PLANTAGO sp.
Plantain, buckhorn, PLANTAGO LANCEOLATA
98. POA ANNUA, Annual bluegrass
99. POLYGONUM LAPATHIFOLIUM (Persicaria lapathifolia), Pale ladysthumb
+ * 100. POLYGONUM MINIMUM, Broadleaf knotweed
+ * 101. POLYGONUM PENNSYLVANICUM, Bigseed ladysthumb
+ * 102. POLYGONUM PUNCTATUM (Persicaria punctata), American smartweed
Poppy, corn, PAPAVER RHOEAS
Poppy, PAPAVER sp.
+ * 103. PORTULACA OLERACEA, Purslane
Potato, SOLANUM TUBEROSUM
(Psamma arenaria) = AMMOPHILA ARENARIA
Purslane, PORTULACA OLERACEA
Quackgrass, AGROPYRON REPENS
Radish, RAPHANUS SATIVUS
Radish, wild, RAPHANUS RAPHANISTRUM
Rape, oilseed, BRASSICA NAPUS var.
104. RAPHANUS RAPHANISTRUM, Wild radish
105. RAPHANUS SATIVUS, Radish
Redroot amaranth, AMARANTHUS RETROFLEXUS
Redscale, ATRIPLEX ROSEA
106. RESEDA LUTEA, Base-rocket
107. RESEDA SP., Mignonette
+ * 108. RUMEX CRISPUS, Curly dock
109. RUMEX sp., Dock
Rutabaga, BRASSICA NAPOBRASSICA
Ryegrass, Italian, LOLIUM MULTIFLORUM
Ryegrass, perennial, LOLIUM PERENNE
Rye, SECALE CEREALE
110. SCABIOSA ATROPURPUREA (Scabiosa maritima), Sweet scabiosa
(Scabiosa maritima) = SCABIOSA ATROPURPUREA
Scabiosa, sweet, SCABIOSA ATROPURPUREA
Scarlet runner, PHASEOLUS COCCINEUS
Sea marram grass, AMMOPHILA ARENARIA
111. SECALE CEREALE, Rye
112. SENECIO VERNALIS, Spring groundsel
113. SENECIO sp., Groundsel
114. SETARIA VIRIDIS (Chaetochloa viridis), Green bristlegrass
Shadscale, ATRIPLEX CONFERTIFOLIA
Shepherds-purse, BURSA BURSA-PASTORIS

(Sinapis alba) = BRASSICA ALBA
(Sinapis arvensis) = BRASSICA ARVENSIS
(Sinapis nigra) = BRASSICA NIGRA
Smartweed, American, POLYGONUM PUNCTATUM
(Soja hispida) = SOJA MAX
115. SOJA MAX (Soja hispida; Glycine max), Soybean
116. SOLANUM DULCAMARA, Bitter nightshade
+ * 117. SOLANUM NIGRUM, Black nightshade
118. SOLANUM TUBEROSUM, Potato
119. SONCHUS ASPER (Sonchus oleraceus asper), Prickly sowthistle
(Sonchus oleraceus asper) = SONCHUS ASPER
120. SOPHIA sp., Tansymustard
(Sorghum saccharatum) = SORGHUM VULGARE SACCHARATUM
121. SORGHUM VULGARE SACCHARATUM (Sorghum saccharatum; Holcus saccharatus), Sorgo
Sorgo, SORGHUM VULGARE SACCHARATUM
Sowthistle, prickly, SONCHUS ASPER
Soybean, SOJA MAX
Speedwell, male, VERONICA OFFICINALIS
Spelt, TRITICUM SPELTA
Spinach, SPINACIA OLERACEA
122. SPINACIA OLERACEA, Spinach
(Stellaria media) = ALSINE MEDIA
Sunflower, common, HELIANTHUS ANNUUS
Sweet pea, LATHYRUS ODORATUS
Tansymustard, SOPHIA sp.
(Taraxacum officinale) = LEONTODON TARAXACUM
123. THLASPI ARVENSE, Pennycress
(Thlaspi bursa-pastoris) = BURSA BURSA-PASTORIS
Timothy, PHLEUM PRATENSE
Tomato, LYCOPERSICON ESCULENTUM
Treacle-mustard, CHEIRINIA CHEIRANTHOIDES
Trefoil, yellow, MEDICAGO LUPULINA
124. TRIFOLIUM INCARNATUM, Crimson clover
125. TRIFOLIUM PRATENSE, Red clover
126. TRIFOLIUM REPENS, White clover
127. TRISETUM FLAVESCENS (Avena flavescens), Yellow trisetum
128. TRITICUM AESTIVUM (Triticum sativum; T. vulgare), Wheat
(Triticum repens) = AGROPYRON REPENS
(Triticum sativum) = TRITICUM AESTIVUM
129. TRITICUM SPELTA, Spelt
(Triticum vulgare) = TRITICUM AESTIVUM
+ * 130. TROPAEOLUM MAJUS, Nasturtium
Turnip, BRASSICA RAPA
131. URTICA DIOICA, Big nettle
132. URTICA URENS, Dog nettle
Velvet bent, AGROSTIS CANINA
133. VERONICA OFFICINALIS, Male speedwell
Vetch, common, VICIA SATIVA
Vetch, hairy, VICIA VILLOSA

Vetch, monantha, VICIA MONANTHA
Vetch, Narbonne, VICIA NARBONENSIS
Vetch, tiny, VICIA HIRSUTA
(Vicia cordata) = a horticultural form of VICIA SATIVA

134. VICIA FABA (Faba vulgaris; Vicia faba major), Broadbean
135. VICIA FABA EQUINA (Vicia faba minor), Horsebean
(Vicia faba major) = VICIA FABA
(Vicia faba minor) = VICIA FABA EQUINA
136. VICIA HIRSUTA, Tiny vetch
137. VICIA MONANTHA, Monantha vetch
138. VICIA NARBONENSIS, Narbonne vetch
139. VICIA SATIVA, Common vetch
(Vicia sativa aestiva) = a horticultural form of VICIA SATIVA
(Vicia sativa hiberna) = a horticultural form of VICIA SATIVA
(Vicia serratifolia) = a horticultural form of VICIA SATIVA
140. VICIA VILLOSA, Hairy vetch
141. VIGNA SINENSIS, Cowpea
142. VITIS sp., Grape
Wheat, TRITICUM AESTIVUM
Woad, ISATIS TINCTORIA
143. ZEA MAYS, Indian corn

The following grasses were found infested with Heterodera sp. in Australia. Specimens submitted were pronounced as probably being H. schachtii but, because of their poor condition, definite determination could not be made.

Barley, mouse, HORDEUM MURINUM

1. BROMUS RIGIDUS, Ripgut grass
Canary grass, PHALARIS CANARIENSIS
2. HORDEUM MURINUM, Mouse barley
3. PHALARIS CANARIENSIS, Canary grass
Ripgut grass, BROMUS RIGIDUS
(Sterile brome) = BROMUS RIGIDUS, Ripgut grass

DISEASES OF HOPS ON THE PACIFIC COAST IN 1934 AND 1935

G. R. Hoerner

1934

The disease of outstanding importance in the hop-growing districts of the Pacific coast is downy mildew (Pseudoperonospora humuli). In some years, during wet harvests, losses from mold caused by Fumago vagans assume serious proportions. Crown gall (Bacterium tumefaciens) is generally present although seldom of economic importance. Undoubtedly, various virus diseases exist, in sections of the northwest especially, but we have not had opportunity to work with them. Extensive losses from root rots are also quite general, but we have not had opportunity of determining the causal organism or organisms. Growers are inclined to attribute any subnormal vegetative growth to disease, and they apply terms in different localities which are misleading.

When downy mildew first made its appearance in the Northwest, in Washington in 1929 and in Oregon in 1930, considerable interest existed on the part of growers, and as a result disease survey reports from them were quite extensive and represented a large proportion of the acreage. Our own work in attempting to discover the limits of infection, of course, added to this information. As growers became familiar with the disease their reports of it diminished, and our own interest in an aggressive disease survey waned, owing to the fact that all commercial hop-growing counties were infected. Losses are so variable that it is difficult to make an accurate estimate, since all of our commercial varieties are affected with downy mildew, and since seasonal weather variations result in either early season or late season infection or both. Viewing the situation as a whole, I would say that the amount of downy mildew has not appreciably varied from year to year; and I attribute, conservatively I think, twenty-five per cent of the acreage damage to this disease.

It will be of interest to note that the past season downy mildew was found on escaped hops in a new county in Oregon, namely Lincoln, at the town of Newport, and that in California the disease appeared for the first time, in Lake, Mendocino, and Sonoma counties. In the latter county serious losses were occasioned by the epidemic.

What appears to be a new disease, apparently due to bacteria, was observed for the first time this season in Oregon. We are tentatively calling it "hop canker." This trouble affects growing shoots.

1935

Field Survey for Downy Mildew

The incidence of downy mildew infection as shown in our records is given herewith.

California County	1935 Number of yards	Oregon County	1935 Number of yards	Washington County	1935 Number of yards
Mendocino	6	Benton	1	Lewis	1
Sacramento	7	Clackamas	1	Pierce	2
Sonoma	3	Josephine	3	Yakima	4
Yolo	5	Lane	1		
Yuba	4	Linn	6		
		Marion	8		
		Polk	4		
		Washington	4		

C. Yarwood reported a total of seven yards infected in Mendocino, Sonoma, and Yolo counties, California, but did not specify the yards, so that his data may or may not be included above. The incidence of infection in Sonoma County may be greater than shown above. In 1934 there were 32 reports of infection in Sonoma County.

Definite information as to the hop varieties affected in California is not available. It is presumed all were Late Clusters. Varietal data available in connection with downy mildew reports in Oregon and Washington follow: Benton County, 1 Early Clusters; Josephine County, 1 Late Clusters; Linn County;2 Late Clusters; Polk County, 2 Late Clusters; Pierce County,2 Fuggles; Yakima County,1 Late Clusters. All other reports referred to in our first tabulation covered infection of unknown varieties.

The reports of downy mildew in Yakima County, Washington, we were again unable to confirm.

It should be borne in mind that despite efforts to have our disease survey data as complete as possible, it is not entirely representative of actual field conditions.

Our first authenticated report of the appearance of downy mildew in the field occurred on April 9, as compared with February 21 in 1934. It should be noted, however, that seedlings collected on March 2 developed mildew when placed in a moist chamber in the greenhouse.

Of particular interest is the sudden appearance of downy mildew in the interior counties of California, namely, Sacramento, Yolo, and Yuba. The infection appeared to be wind-borne. Such an hypothesis is not improbable if one considers the report on the spore collections made on the last National Geographic-Army Air Corps stratosphere balloon flight. Reports of these spore collections indicated that five of seven groups of spores lived through all of the rigors of the stratosphere conditions. It is not impossible, therefore, that the downy mildew infection in central California might have been blown in from heavily infected coastal counties.

Miscellaneous Hop Diseases

Canker (bacterial). This trouble was first observed in the experimental yard on May 6. On May 15 training was well under way, and no opportunity was afforded to survey hill by hill. Numerous varieties of hop plants, both male and female, were affected. Infection was most common, as previously reported, on the internodes, though some petioles and tips of runners were affected. Very little ooze was present, and what was observed was completely dry, but always at the point of contact of the suckers with the soil. Some Diabrotica damage was evidenced, but was in no way related to the appearance of the canker. Click beetles were also observed, but their association with the canker condition was not apparent. A survey of this trouble is presented.

CALIFORNIA

Mendocino County - reported by Yarwood, from several yards in the Hopland district, variety affected unknown.
Sacramento County - Three reports, variety presumably Late Clusters.
Sonoma County - One report as above.
Yolo County - Three reports as above.
Yuba County - Two reports as above.

OREGON

Benton County - One report on Early Clusters.
Linn County - One report on Late Clusters, one report on Red Vines, and one on unknown variety.
Marion County - One report on Late Clusters, two reports on unknown variety.
Polk County - One report on Late Clusters.
Yamhill County - One report on Fuggles.

WASHINGTON

Lewis County - One report on Fuggles.
Yakima County - One report on unknown variety.

Canker (fungous). This condition was referred to as a wilt in one of our earlier reports. Its presence is not common, and it is not of economic importance. Survey data are included herewith.

OREGON

Josephine County - One report of unknown variety.
Linn County - One report on Humulus lupulus var. neo-mexicanus. The latter collection was made in the experimental yard on Plant No. 12-6 on July 29, 1935. This was resulting in a wilt of maturing vines, and apparently entrance had been obtained at the stripping wound at the base of the vine. The affected woody tissues were streaked brown, Isolations of the fungus associated with the condition were made in the laboratory.

Crown Gall. Survey data only is presented herewith.

CALIFORNIA
Sonoma County - Reported by Yarwood, presumably on Late Clusters.
OREGON
Linn County - One report, variety unknown.
Marion County - One report, variety unknown.

Root Rot. This is an annual problem of economic importance throughout the hop-growing area of the Pacific Coast. Little data, however, are available on specific survey reports. As an example of the importance of the problem it might be pointed out that the Wigrich Ranch at Independence, Oregon, consisting of 393 acres, before hoeing had to replant 127 acres the past season, with the expectation of 5 per cent additional replanting necessary at the time of hoeing when crowns formerly missed would become evident. Missing hills are due doubtless in large part to root rot. Under this title the following data are available:

OREGON
Clackamas County - Two reports
Lane County - One report.
Marion County - Six reports.
Polk County - Three reports.
Washington County - One report.
All of the above on unknown varieties.

Sooty Mould. Survey data presented for:

OREGON
Linn County - One report.
Marion County - Two reports.
Polk County - Two reports.
All of the above on unknown varieties.
WASHINGTON
Yakima County - Twelve reports on unknown variety.

Virus Diseases

This general term includes a number of conditions which in survey reports are designated by various terms, some of which very definitely are true virus diseases; others are placed in this category because they are suspected of being so, although definite proof is not available in all cases.

Blight

OREGON
Clackamas County - Two reports.
Linn County - One report.
Marion County - One report on Late Clusters, seven reports on

unknown varieties.
Polk County - One report on Late Clusters.
Yamhill County - One report.
Where not otherwise indicated the varieties are unknown.

Brown Heads.

OREGON
Marion County - One report on Early Clusters, one report on Late Clusters, and one report on unknown variety.

Dead Heads.

OREGON
Marion County - One report on unknown variety.

Dieback.

OREGON
Marion County - One report on unknown variety.

Dormant Hills.

OREGON
Clackamas County - Two reports.
Marion County - Four reports
Polk County - Four Reports
All of the above on unknown varieties.

Mosaic.

OREGON
Marion County - One report on Fuggles, four reports on Late Clusters.
Linn County - One report on Late Clusters.
Polk County - One report on Late Clusters.

Sleepers.

OREGON
Marion County - One report on unknown variety.

Virus.

OREGON
Marion County - Two reports on unknown variety.
(Division of Drug and Related Plants)

OBSERVATIONS ON WEATHER CONDITIONS AND PLANT DISEASES IN TENNESSEE

Paul R. Miller

In the plant disease survey of Tennessee which has been carried on during the growing seasons of 1933, 1934 and 1935 we have had the cordial support of the pathologists of the Experiment Station and of the respective county agents involved. All agree that plant disease control methods are little practiced in this region. This fact, and the highly diversified agriculture of the State, as well as the weather conditions which seem especially favorable for the development of plant diseases, have combined to make the survey instructive and interesting. Its results indicate that disease control should become of immediate personal interest and direct financial value to the farmer. Besides the heavy losses to cash crops such as tobacco, grain, cotton, potatoes and truck crops, there is a heavy tax laid by disease on crops that never reach the national market but are consumed locally, largely on the producer's place. Plant diseases thus act directly to reduce both the cash income and the labor income of the operator and to diminish his food supply.

The following pages contain: first, several charts of weather compilations; second, a few reports on diseases correlated with these weather conditions; and third, some of the most significant observations on diseases including only those upon which definite estimates of loss could be determined.

Notes and specimens accumulated during this survey have been placed in the files and collections of the Division of Mycology and Disease Survey.

Weather Considerations

The incidence of plant diseases is so tied up with weather conditions that a brief summary of the salient facts regarding rainfall and temperature for the growing seasons of 1933, 1934 and 1935 is considered pertinent to this report.

From a meteorological point of view, the growing seasons (April to October) only have been considered. It has been observed that if the mean temperature and rainfall are computed on an annual basis the variation is usually slight. During the growing seasons only, however, the deviations are usually much greater. Although abnormal winter rainfall and temperature may affect the development of plant diseases the following season it is doubtful whether such effect is so acute as that of unusual weather conditions while the crop is growing. The actual temperature and rainfall are considered less significant than the percentage deviation from the normal, since it is assumed that over a period of years, within a given region used for growing more

or less standard economic crops, an equilibrium is reached between the host and fungus and that only unusual departures from the normal which disturb the balance will contribute toward unusual losses.

The accompanying chart (Fig. 6) shows the percentage of the normal mean temperature and rainfall for April, May, and June combined, and for July, August, and September combined, for twenty-two stations during the years 1933, 1934 and 1935. It will be noted that with very few exceptions the summer temperatures were above normal. Generally speaking, the temperatures for the years 1933 and 1934 ranged from 101 to 106 per cent of the normal, while the rainfall for the three years varied from 21 to 179 per cent of the normal. It will also be noted that there are wide variations in the rainfall at stations in close proximity, which indicates that if weather records are to be of maximum value in showing the relation of weather to plant diseases they must be made locally and computed on a short time basis.

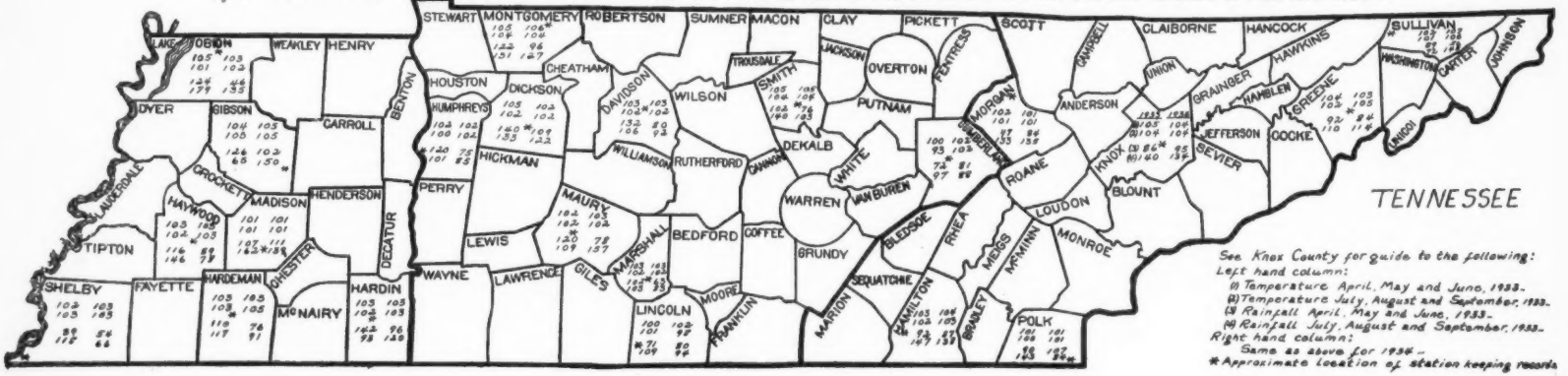
Figure 7 shows the actual accumulated rainfall for the growing seasons of 1933, 1934, and 1935, in comparison with the normal at the six stations: Union City and Memphis in West Tennessee, Nashville and Copper Hill in Middle Tennessee, and Kingsport and Knoxville in East Tennessee. It will be observed that during these six months' periods, precipitation was only 12 inches at Memphis in 1934, as compared with 35 inches at Union City in 1933. These two stations, in West Tennessee, show the greatest range in rainfall, both as between stations in the same section, and as to yearly amount. Less fluctuation is observed in Middle Tennessee, and only slight variation in East Tennessee.

Weather as a Probable Factor Contributing to Some Unusual Plant Disease Losses

The following list contains the record of some plant disease losses accompanied by notes on the prevailing weather conditions thought to have had a bearing on the development of the diseases.

Disease Losses	Prevailing weather conditions thought to have had a bearing on the development of the disease
Counts showed about 20 per cent loss on apples in Knox County due to bitter rot (*Glomerella cingulata*) (1934).	The August rainfall was 3.55 inches above normal. Rain fell each day with the exception of two from August 7 to August 27 inclusive. The mean monthly temperature was 2.2 degrees above normal.

Fig 6. PERCENTAGE DEVIATION FROM THE NORMAL ACTUAL RAINFALL AND MEAN TEMPERATURE FOR THE GROWING SEASONS OF 1933 AND 1934.


TENNESSEE
See Knox County for guide to the following:
Left hand column:
(1) Temperature April, May and June, 1933.
(2) Temperature July, August and September, 1933.
(3) Rainfall April, May and June, 1933.
(4) Rainfall July, August and September, 1933.
Right hand column:
Same as above for 1936.
* Approximate location of station keeping records

SAME AS ABOVE FOR 1935

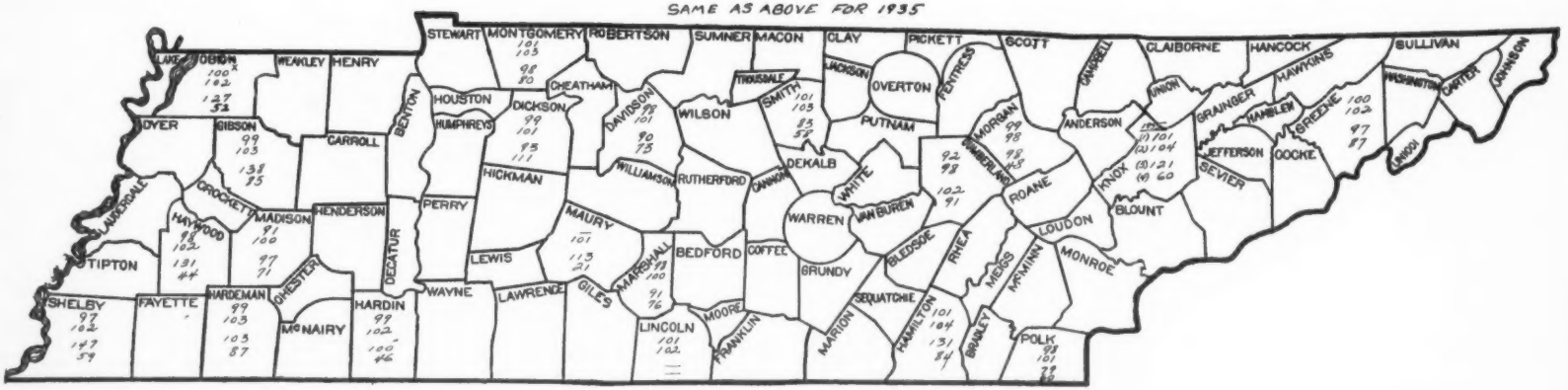
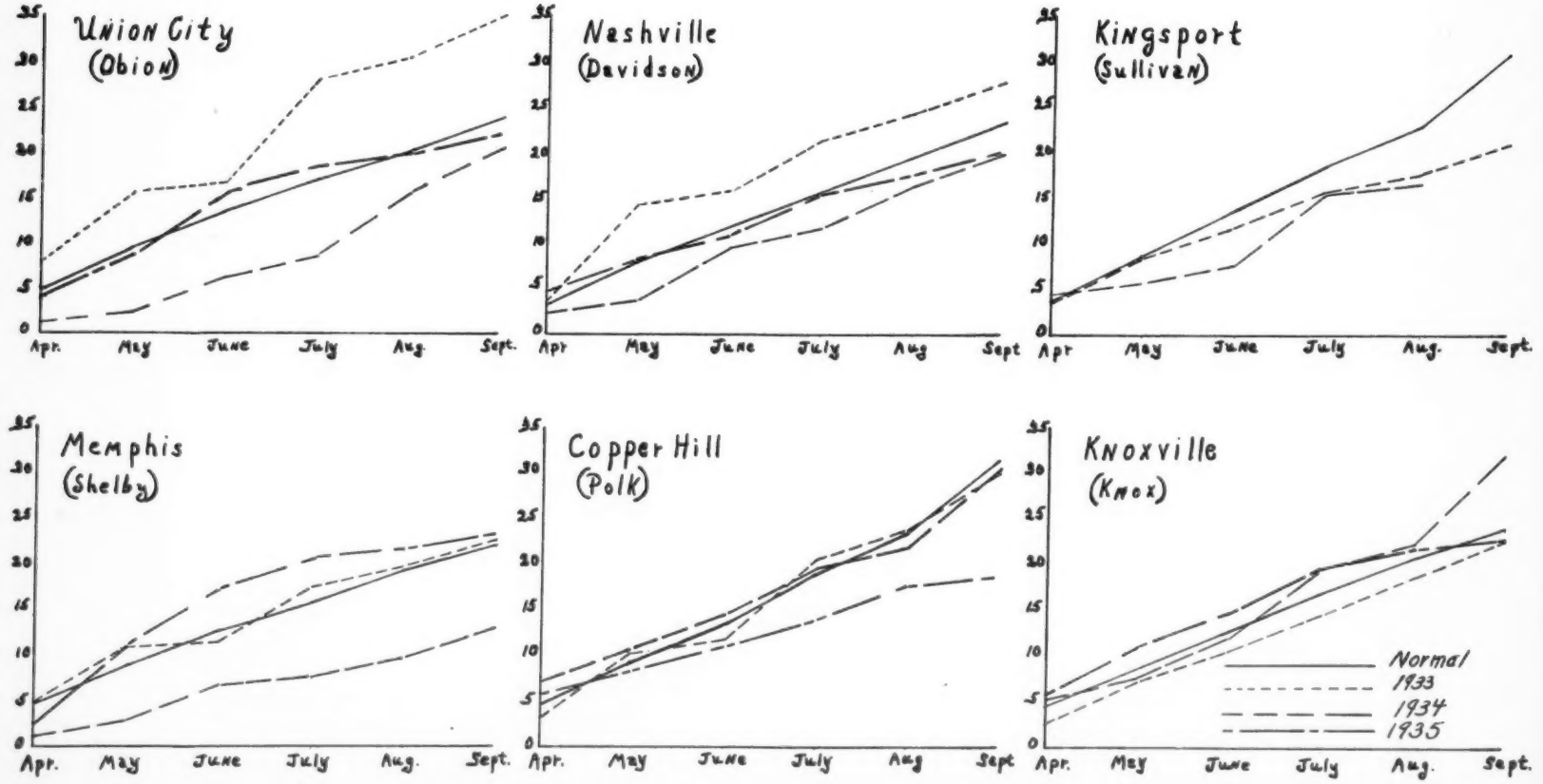


Fig. 7. The Accumulated Actual Precipitation Records Compared With The Normal Of Three Growing Seasons For Six Tenn. Stations.



Seventy-five per cent of the locust seedlings in an eight-acre TVA nursery at Clinton were found to be infected with Rhizoctonia solani. (1934)	Rainfall at this station was more than double the normal for the month of August. There was less than 50 per cent of the possible number of hours of sunshine for the month.
In Southwestern Tennessee angular leaf spot (Bacterium malvacearum) on cotton caused more loss than had been observed in any one year for fifteen years. (1934)	Rains occurred each day from June 5 to 25 inclusive with the exception of the seventh, followed on the eighteenth by 3.94 inches of rainfall accompanied by strong wind.
Near Jackson growth cracking caused unusual damage to Stayman apples. Approximately 25 per cent of the fruits in one ten-acre block of Staymans were cracked. (1934)	The last half of July and the month of August were exceptionally dry, followed by heavy rains the first of September.
Tomato buck-eye rot (Phytophthora terrestris) caused about 10 per cent loss in Bedford County, August, 1934.	There were ten consecutive days of rain during August.
Apple rust (Gymnosporangium juniperi-virginianae) caused considerably more infection and loss than usual in Knox County in 1934. The varieties of apples and percentage of rusted leaves were Rome 65; Golden Delicious 57; Wealthy 68; Jonathan 32; Yellow Transparent 27.	Spore horn emergence and sporulation took place May 5, 10, 16, 22 and 29, with the following amounts of rainfall recorded in inches: .57, .85, 1.34, .77 and .40 respectively. These dates coincided with the time of the greatest leaf expansion of that season.

Observations on Diseases

Tobacco: A very definite stimulus to interest in plant diseases in Tennessee was given during the spring of 1933 by an outbreak of downy mildew of tobacco, since on many farms tobacco is the chief and sometimes the only cash crop. This was the first instance in which tobacco mildew (Peronospora tabacina) has been found west of the Appalachians. It was found scattered over twenty-two counties on plants almost large enough to set out, consequently causing delay in planting and in a few cases killing as high as 50 per cent of the plants in the bed. In 1934 the disease was not observed and in 1935 it was found only in Greene and Smith Counties in scattered amounts.

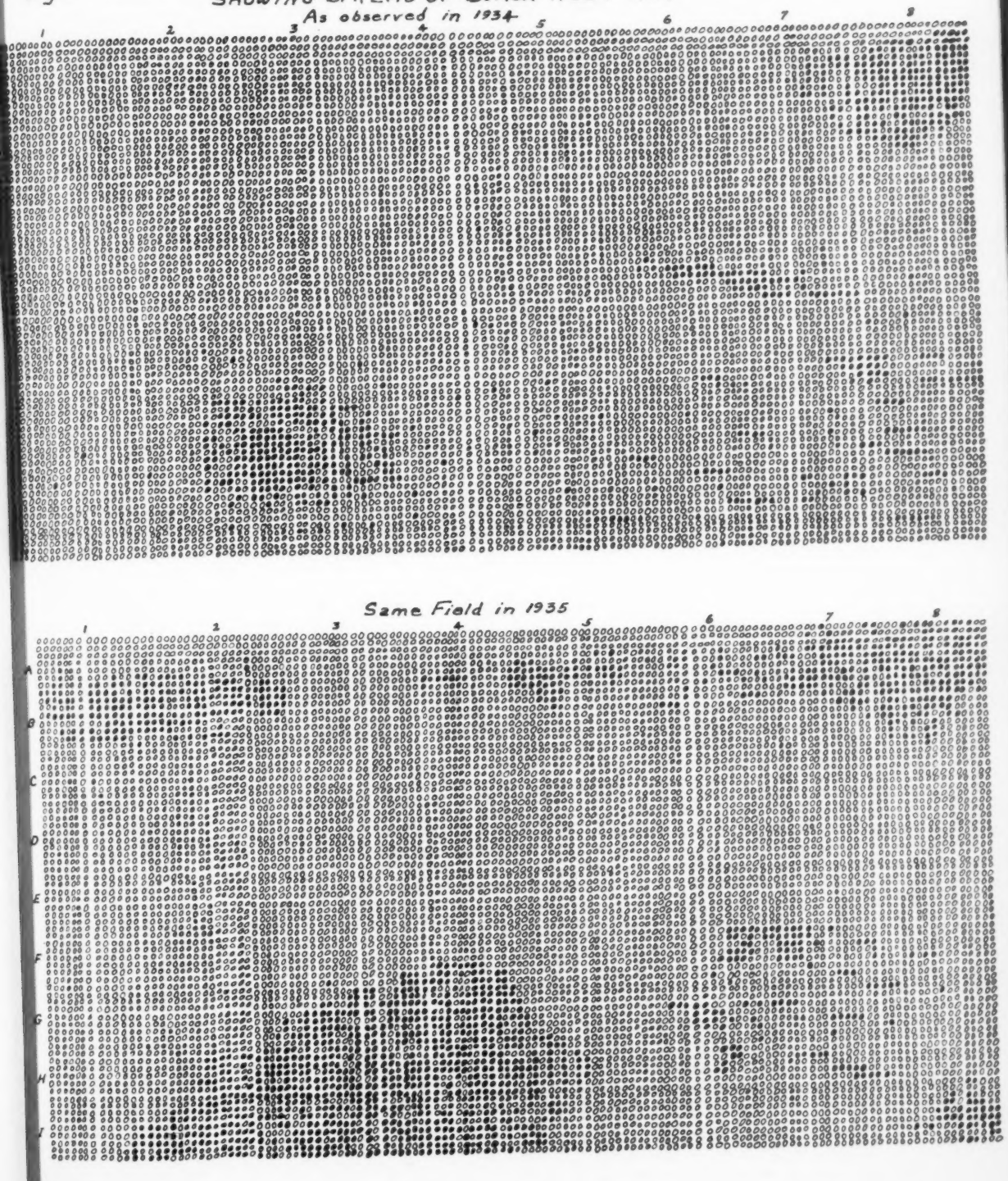
Black shank (Phytophthora parasitica nicotianae) on tobacco was observed in Robertson County, August, 1935. This was apparently the first authentic report of this disease in Tennessee. About four acres of dark fired tobacco were destroyed in a nineteen-acre field.

It was thought desirable to obtain additional information on the prevalence of black root rot (Thielaviopsis basicola)of tobacco, as it had been observed that this disease was increasing in many fields in the Greeneville section. The accompanying chart (Fig. 8) shows the approximate plan of an individual field. The solid circles represent diseased plants and the open circles healthy plants. As can be seen, the disease increased from 6 per cent in 1934 to 14 per cent in 1935. Prior to the 1934 season lime had been piled upon and distributed from that portion of the field represented by A 8. Section H 3 was somewhat lower than the surrounding area. A topographical map might help to explain the distribution of this disease since, in general, it appeared more prevalent in the lower sections. New areas of infection are evident on the 1935 chart so distributed as to suggest that cultivation may have played a part by carrying either the fungus or the lime or both along the rows.

Cabbage: Actual counts of loss of cabbage due to black rot (Bacterium campestre) were made in various fields in East Tennessee in 1934. The information obtained is recorded as follows:

Place	Acreage	Per Cent Loss
TVA gardens, Norris	3	95
Cumberland County Relief Gardens	5	20
Cumberland Homesteads	4	60
Gardens of employees - Aluminum Plant, Alcoa	5	65
Farm gardens	12	40

Fig. 8. CHART REPRESENTING A ONE-ACRE FIELD OF TOBACCO PLANTS SHOWING SPREAD OF BLACK ROOT ROT



Potato: In 1935 one county was selected in which to make counts of the effect of certified seeds on stands and the percentage of potato plants affected with virus diseases. These counts involved 115 acres.

Not certified	64 per cent stands	17 per cent diseased plants
Certified	98 per cent stands	1.5 per cent diseased plants

Corn: A survey for corn smut (Ustilago zeae) was made in a selected county of West, Middle, and East Tennessee for the years 1933, 1934, and 1935. The procedure in determining the percentage of smut was to select several rows at random and then count the smutted plants and record according to the location of the disease on the plant. It will be noted that the amount of smut is closely correlated with the accumulated rainfall as shown by weather records of the stations involved. It was observed that stalk smut was more prevalent in lower portions of the field.

Table 7. Amount of corn smut observed in three counties in Tennessee in 1933, 1934, and 1935.

Year	Location	Number acres involved	Per cent diseased plants	Per cent of smut on plant parts		
				Stalk	Ear	Tassel
1933	East Tennessee, Knox County	175	8	5	3	1
1934		200	5	3	2	0.5
1935		180	3	2	1	0.2
1933	Middle Tennessee, Davidson County	250	5	3	2.5	0.4
1934		260	2	1.5	1	0.1
1935		400	3	1	2	0.3
1933	West Tennessee, Obion County	160	8	5	4	2
1934		130	1	0.8	0.4	0.1
1935		90	5	3	3	0.2

Barley: An intensive and extensive survey was made to estimate the amount of loss caused by the barley smuts (Ustilago spp.) in 1935. One county in East Tennessee was selected for the intensive survey. The percentage loss was arrived at by making a minimum of ten counts of 100 consecutive plants each, selected at random, in 27 fields comprising 350 acres. The loss in these fields varied from 5 per cent to 45 per cent, with an average loss of 18.5 per cent. The loss sustained in this county was apparently representative of the loss in East Tennessee generally, as evidenced by less intensive observations

in eight other counties. It was impossible always to distinguish the covered smut (U. hordei) from the loose smut (U. nuda), but there appeared to be about five times as much of the former as of the latter.

Losses on other small grains have been presented elsewhere in the Plant Disease Reporter. (Division of Mycology and Disease Survey).

FRUIT AND VEGETABLE LOSSES IN MARKET AND KITCHEN CAUSED BY PLANT DISEASES

Paul R. Miller

Estimates of the amount of loss sustained by distributors and consumers of Knoxville, Tennessee, on twenty-four fruits and vegetables were presented in Supplement No. 88 of the Plant Disease Reporter, September, 1935. Additional records kept cooperatively with the distributors and consumers during November and December, 1935 and January, 1936 yielded results which in no case varied more than 1 per cent from the figures previously obtained on these products. However, estimates have been prepared for five additional fruits and vegetables which are presented herein. The methods of securing this information were the same as those reported previously.

The distributors' loss, as recorded in the following table, was arrived at by combining the results of the fifteen records kept cooperatively with the wholesalers and retailers for periods of two weeks or more each and the results of ten to twenty-five personal inspections. The consumers' loss, recorded in the same table, was arrived at by combining the results of the records kept for one month or more by twenty-five consumers and the results of the records kept by the cafeterias cooperating. All records were kept in accordance with a prearranged plan and final determinations of causes of losses were checked personally.

Table 8.—Estimated fresh fruit and vegetable loss sustained by distributors

Table 8. Estimated fresh fruit and vegetable loss sustained by distributors and consumers.

Product	Amounts and No. samples estimates based upon	Total % Loss	Percentage loss from various causes					
Pears (Pyrus communis) [1]	400 bu. (45)	10	Blue mold (Penicillium expansium) Botrytis sp.	7	Core breakdown Scald [3]	3	Scab (Venturia pyrina) Black spot (Fabraea maculata) [4]	
" [2]	8 bu. (32)	4	"	1	"	2	"	1
Pineapple (Ananas sativus)	50 crates (10)	3	Soft rot (Thielaviopsis paradoxa)	3				
"	60 frts. (20)	1	"	1				
Grapes (Vitis sp.)	50 lugs (25)	12	Botrytis sp.	8	Undetermined decays	4		
"	75 lbs. (16)	4	"		"	4		

1/ Upper row for each product represents distributors' loss.
2/ Lower row for each product represents consumers' loss.
3/ Many times this type of loss is not known to be present until the fruit is prepared for use.
4/ These diseases may cause the distributors a monetary loss, but the actual loss is borne by the consumer.

Table 8 (Cont'd)

Product	Amounts and No. samples estimates based upon	Total % Loss	Percentage loss from various causes			
Squash (Cucurbita pepo condensa)	95 hampers (30)	5	Side rot (Fusarium oxysporum) 5/	5		
			Stem rot (Fusarium semitectum)			
"	60 individuals (20)	6	"	6		
Cherry (Prunus avium)	120 lugs (40)	8	Brown rot (Sclerotinia fructicola)	6	Alternaria sp. undetermined	2
6/						

5/ These are the first losses recorded for these fungi on summer squash as far as the writer is aware. The identifications were made by C. D. Sherbakoff.

6/ No consumer records for cherries.

(Division of Mycology and Disease Survey)

NOTES ON DISEASES OF ORNAMENTALS

Thelma Bennett Post

Venturia Rhododendri on Azalea. In December, 1935, an azalea of the Kurume type was received from Louisiana, which bore numerous purplish-brown spots visible on both surfaces of the leaves. On the upper surface these spots were coalesced so that almost the entire leaf tip was involved. Leaf yellowing and severe defoliation accompanied the spotting, but these effects may have resulted from an unfavorable soil reaction (pH 7.0). A fungus whose description agreed with that of Phyllosticta maximi Ell. and Ev., the imperfect stage of Venturia Rhododendri Tengwall, was isolated from the spots. This fungus was first described in 1888 on leaves of Rhododendron collected in Massachusetts.

Botrytis on Exacum affine. A Botrytis of the cinerea type was isolated from stem cankers on young plants of Exacum affine (Gentianaceae) received from Wichita, Kansas, on December 3, 1935. The depressed water-soaked cankers appeared at the base of the stem and at the nodes. The top of the plant had wilted. The symptoms corresponded very closely with those of a virulent infection of Gentiana andrewsii which occurred in a naturalized planting at Tannersville, New York, in 1928, and which also yielded a Botrytis of this type. The grower of the Exacum specimens reported the damage general and severe throughout his stock. (Division of Fruit and Vegetable Crops and Diseases)

FUSARIUM ON GLADIOLUS

Lucia McCulloch

The February 1, 1936 (Vol. 20, No. 2) number of the Plant Disease Reporter, p. 31, refers to an article in The Gladiolus, 1936, published by the New England Gladiolus Society, as probably the first printed record of a corm rot and wilt of gladioli caused by Fusarium. Since then two earlier records have been found. An unsigned article, Core Rot of Gladiolus, p. 27, Florist's Review, March 16, 1933, states that the disease has been observed and studied by L. M. Massey and F. F. Weinard.

Notes on Glad Core Rot, by John K. Bellard, p. 14, Florist's Review, April 27, 1933, gives a good description of the disease. (Division of Fruit and Vegetable Crops and Diseases)